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TITLE: Telemedicine Based Ultrasound for Detecting Neonatal Heart Disease in Babies
at Remote Military or Native American Health Care Facilities

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14. ABSTRACT Our partnership of investigators from Madigan Army Medical Center at Fort Lewis, Washington, and Oregon Health & Science University in Portland, will test the hypothesis that trained primary care practitioners or nurses can, with telemedicine supervision, perform cardiac ultrasound exams on neonates at risk for heart disease, and thereby impact time to diagnosis and outcomes. This study is targeted at Military Medical Facilities within TRICARE West and Western Regional Medial Command. It will also include two large Alaska Native Health Care Centers. Echocardiography has had major impact in the management of neonates suspected of having congenital heart disease. The expensive, specialized equipment and significant expertise to adequately perform and interpret these studies usually is present only in tertiary level medical centers with a pediatric cardiologist on staff. Initial results of a National Multicenter Neonatal Telemedicine Echo Outcomes Study, developed by the Principal Investigator, suggest that telemedicine-implemented diagnosis positively affects outcomes in infants suspected of having congenital heart disease. As an added impact of our program, we will develop expertise within caregivers who have previously not been able to perform these necessary exams, and will integrate the use of low-cost, yet high-performance hand-held ultrasound scanners, so as to provide the participating centers with new diagnostic health care capabilities.					
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Introduction

Our DOD Neonatal Telemedicine Echocardiography program, managed by the investigators at Oregon Health & Science University (OHSU) and Madigan Army Medical Center (MAMC), has been implementing the distribution and installation of SonoSite hand-held ultrasound devices; the completion of human subjects paperwork; the training of physicians from Washington, California, and Alaska; and the installation of telecommunications infrastructure in order to implement the outcomes study of the impact of locally performed but remotely supervised congenital heart disease echocardiography in neonates.

We have made significant headway now in training of our network physicians, installation of the echocardiographic equipment, and in solidification of the telecommunications infrastructure to activate sites.

Progress this year; however, was substantially set back when LTC Robert Puntel, the Madigan Co-PI, deployed to Iraq in early December 2004. COL James Kinney assumed the role of Madigan Co-PI and working with our new Administrator, Allegra Frank, they have helped position us to solidify the telecommunications infrastructure.

A full update on the status of all Human Subjects protocols and our qualifications to run interact with each base.

Progress Report

The tasks in this project involve:

1. Installation of ultrasound scanning and telemedicine network equipment, set-up and testing of website for data- Completed

Dr Puntel finally returned to MAMC in September of 2005 and we began videoteleconferencing trials with him.

We have transitioned our telecommunications completely to the Non-Secret IP Router Network (NIPRNET) with all paperwork approved at MAMC. This gives us up to 712kpbs of bandwidth and improved visualization of the cardiac images.

DITSCAP for Connectivity at Military Treatment Facilities

In December 2004 we learned of an existing infrastructure within the Military Treatment Facilities (MTF), NIPRNET (Non-Secret IP Router Network). A major benefit to utilizing the NIPRNET for the TeleEcho System is sustainability. We would be able to establish point-to-point connections for all military remote sites in the study to MAMC/OHSU at no additional cost to the grant. Whereas establishing a commercial network between the 6 MTFs would have cost the grant in excess of \$225,000 over the 40 month data collection period for the study. Utilization of the NIPRNET would also offer a more robust platform for the TeleEcho Project, including higher bandwidth than we could afford, additional security, and increased reliability. Finally, if research from the TeleEcho Project leads to a new standard of care within the DOD for telediagnosis of newborns at remote facilities; then connection to the NIPRNET for each MTF is ideal due to the sustainability of the project once the research study and funds has ended.

With the assistance of an Information Assurance Manager for WRMC, we drafted a System Security Authorization Agreement (SSAA) for DOD Information Technology Security Certification and Accreditation Process (DITSCAP) Certification and Accreditation (C&A) on the TeleEcho System at Madigan Army Medical Center. MAMC's Designated Approving Authority approved the TeleEcho System SSAA on 23 August 2005, issuing an Interim Authority to

Operate (IATO). A full ATO is expected from NETCOM by March 2006. If NETCOM is backlogged, MAMC will authorize another IATO to keep the TeleEcho System activated. Connectivity was achieved on 1 September 2005 and the first test call between MAMC and OHSU was placed on 25 October 2005. On 3 November 2005, LTC Robert Puntel at MAMC sent the first infant echocardiogram via the TeleEcho System to Dr Sahn at OHSU. The successful transmission ensured that the equipment was completely compatible.

The approved MAMC TeleEcho System SSAA and approval letter has been sent to each site. The SSAA was drafted to be easily adaptable for every military medical facility involved in the Project, so C&A should follow relatively quickly for each of the remote sites. Utilizing the military's existing network infrastructure and security will save the grant at least \$250,000 over the collection period and ensures stability, sustainability, and viability if the system becomes standard of care within the DOD's health care system.

3rd Medical Group (3MDG), Elmendorf AFB, and AK – We are working with HQ Air Force Communication Agency to complete the DITSCAP for 3MDG TeleEcho.

Bassett Army Community Hospital (BACH), Ft Wainwright, Fairbanks, AK – Information Management Division approved the connection of the TeleEcho System at BACH in January 2006. Connectivity was achieved and technical test calls were conducted between BACH and MAMC on 18 January 2006. First transmission of an adult echocardiogram from BACH to MAMC was conducted on 20 January 2006; followed shortly after by an infant echocardiogram. BACH is our first remote site ready to enroll subjects into the study.

Naval Hospital Bremerton (NHB), Bremerton, WA – The Chief Information Officer (CIO) and Information Systems Security Manager (ISSM) stated in December 2005 that Naval Hospital Bremerton does no longer have the staffing to do a DITSCAP and SSAA for TeleEcho. If once a DITSCAP and SSAA is recognized and accepted by higher authority then Bremerton will move forward and accept the TeleEcho System on their network. We will forward the ATO from NETCOM once received.

Naval Hospital Oak Harbor (NHOH), Oak Harbor, WA – IMD was provided with a copy of the approved MAMC TeleEcho System and approval letter with all supporting documentation. The NETCOM issued ATO will also be forwarded to NHOH when it arrives.

Weed Army Community Hospital (WACH) – IMD at WACH is finalizing the approval to connect the TeleEcho System to the NIPRNET. The equipment is being set up and the network administrator has already assigned a static fixed IP address to the system. We anticipate conducting technical test calls between MAMC and WACH in February 2006.

2. Training of staff - Complete

Final completion and certification of all individuals for participation is summarized below related to the human subjects approval process for all institutions to be activated in the initial tier of study sites.

Beginning entry of patients into the study. **See Human Subjects Certification below.**

Training & CME Complete

Since February 2004, 13 TeleEcho Training Sessions have been held and 23 providers have received training. 14 category 1 CME credits became available for any TeleEcho Training Sessions held after 29 September 2004. Since then 126 Category-1 CME credits have been awarded for successful completion of training. This initial training for pediatricians, family physicians or nurse practitioners for the TeleEcho Project is held at Madigan Army Medical Center in the pediatric clinic and the NICU and has 6 main learning objectives.

Learning objectives:

1. Learners will understand the physical basis of ultrasonography including 2-dimensional imaging and Doppler ultrasound utilizing both, the portable SonoSite ultrasound machine as well as standard ATL or HP echocardiography machines.
2. Learners will learn and demonstrate competence in performing the complete transthoracic echocardiogram with practice and demonstration on consented infants at Madigan AMC to include 2-dimensional views, color and spectral Doppler interrogation, and m-mode echocardiography.
3. Learners will discuss and demonstrate understanding of common congenital cardiac defects and their appearance on echocardiography as well as their clinical presentation using live patients as available, as well as internet, text, slides, and videotaped cases.
4. Learners will discuss and demonstrate understanding of the clinical management of congenital cardiac lesions.
5. Learners will review Human Subject issues and consenting families, as well as data entry, internet systems for data collection, and the equipment used to transmit and record the tele-echo images.
6. Learners will demonstrate competence with Protection of Human Research Subjects by completing either CITI or NIH online training.

Summary February 2005 – January 2006:

- 4 TeleEcho Training Seminars
- 8 days of training
- 8 Physicians trained to perform supervised echocardiograms
- CME Credits Offered: 70
- CME Credits Assigned: 70

The institutional individuals trained and their dates of training are shown in the table below:

February 21 – February 22, 2004	CPT Ronald Wells, MD, BACH
March 24 – March 25, 2004	LCDR Andrea Donalty, MD, NHOH
March 29 – March 31, 2004	CPT Athena Stoyas, MD, WACH
April 10 – April 12, 2004	Dr. Michael Engel, ANMC
	Dr. Calle Gonzales, ANMC
	Dr. Haitham Salman, ANMC
April 17 – April 19, 2004	CDR Karie Andersen, MD, NHB
	LCDR Rose Dieffenbach, MD, NHB
September 29 – September 30, 2004	CPT Robert Warner, MD, WACH
December 9 – December 10, 2004	MAJ Donald Lane, MD, 3MDG
	COL David Estroff, MD, MAMC
	CPT Katy Gibson, MD, MAMC (Resident)
December 14 – December 15, 2004	CDR Victoria Crescenzi, MD, NHB
	CPT Katy Gibson, MD, MAMC (Resident)
January 11 – January 12, 2005	MAJ Nola McManus, MD, 3MDG
	MAJ John Harvey, MD, MAMC NICU
March 14 – March 15, 2005	LCDR Christopher Westbrook, MD, NHB
	CDR Ronald Dommermuth, MD, NHB
	Dr Daisuke Kobayashi, MAMC (Resident)
May 17 – May 18, 2005	Cathy Binder, NP, BACH
October 20 – October 21, 2005	CPT Peaches Richards, MD, WACH

	CPT Rebecca Garfinkle, MD, BACH
	CPT David Eigner, MD, MAMC (Resident)
January 24 – January 25, 2006	MAJ Laura Peterson, MD, 3MDG

3rd Medical Group, Elmendorf AFB - Anchorage, AK
MAJ Donald Lane, MD
MAJ Nola McManus, MD
MAJ Laura Peterson, MD

American Native Medical Center - Anchorage, AK
Michael Engel, MD
Calle Gonzales, MD
Haitham Salman, MD

Bassett Army Community Hospital, Ft Wainwright - Fairbanks, AK
CPT Ronald Wells, MD
Cathy Binder, NP
CPT Rebecca Garfinkle, MD

Madigan Army Medical Center, Ft Lewis - Tacoma, WA
COL David Estroff, MD
MAJ John Harvey, MD

Naval Hospital Bremerton, Naval Station Bremerton - Bremerton, WA
CDR Karie Andersen, MD
LCDR Rosemarie Dieffenbach, MD
CDR Victoria Crescenzi, MD
CDR Christopher Westbrook, MD
CDR Ronald Dommermuth, MD

Naval Hospital Oak Harbor, Naval Air Station Whidbey Island – Oak Harbor, WA
LCDR Andrea Donalty, MD

Weed Army Medical Center, Ft Irwin, CA
CPT Athena Stoyas, MD
MAJ Robert Warner, MD
CPT Peaches Richards, MD

Protocol Approvals Almost complete-pending USN San Diego review.

The TeleEcho master subject protocol was reviewed at The Surgeon General's Army/Navy Human Subjects Research Review Board (HSRRB) meeting on 14 May 2003 and approved with recommendations as a greater than minimal risk study. A revised protocol, consent documents, and supporting documents have received final approval by the HSRRB, effective date, 9 February 2004. On 23 February 2005 and most recently on 24 January 2006, the subject protocol and accompanying consent forms were approved for continuation by the Madigan Army Medical Center (MAMC) Institutional Review Board (IRB). MAMC IRB has approved study continuation for Bassett and Weed Army Community Hospitals.

Staff Changes:

1. MAMC staff: COL (Ret) Edward Carter, MD was removed as an Associate Investigator on the master protocol effective 1 December 2005. COL James Kinney, MD changed from MAMC Principal Investigator (PI) to Associate Investigator (AI) on 1 September 2005. LTC Robert Puntel, MD changed from MAMC AI to PI upon return from a deployment to Iraq, effective 1 September 2005.
2. Bassett Army Community Hospital (BACH) staff: CPT Ronald Wells, MD, PI left the study on 1 May 2005 due to a permanent change of station (PCS). Cathy Binder, NP joined the study as an AI on 1 March 2005. CPT Rebecca Garfinkle, MD joined the study as the PI on 21 July 2005. CPT Steven Jay, MD joined the study as the medical monitor on 6 December 2005.
3. Weed Army Medical Center (WACH) staff: CPT Athena Stoyas, MD, PI left the study on 1 July 2005 due to a PCS. CPT Peaches Richards, MD joined the study as the PI in August 2005. MAJ Robert Warner, MD changed to AI at that time. MAJ Thomas Byrne, MD joined as the study's medical monitor on 6 October 2005.

3rd Medical Group (3MDG) at Elmendorf AFB received approval through the IRB at Travis AFB, CA on 2 May 2005. MAMC Human Use Committee (HUC) approved the 3rd MDG, Elmendorf AFB as a remote participating site in the master protocol on 27 September 2005 without stipulations. The continuing review for 2006 and amendment is currently in work and will be forwarded to HSRRB with all supporting documentation.

Staff Changes: MAJ Donald Lane, MD, 3MDG PI left the study due to an emergency PCS. MAJ Nola McManus, MD, 3MDG AI took care of PI duties in the interim but MAJ Laura Peterson, MD joined the study on 15 December 2005 and will take over as the new PI.

Alaskan Native Medical Center (ANMC) received local IRB approval on 28 March 2005. The MAMC HUC approved ANMC as a study site participant in the master protocol on 28 June 2005 without stipulation. ANMC's site specific protocol and supporting documentation were forwarded to HSRRB on 20 June 2005. We are still awaiting final approval from HSRRB.

Staff Changes: None.

Bayne-Jones Army Community Hospital (BJACH) received IRB approval from Brooks Army Medical Center (BAMC) on 19 August 2005. MAMC HUC approved Bayne-Jones Army Community Hospital as a remote participating site on 27 September 2005 without stipulations. BJACH's site specific protocol and supporting documentation were forwarded to HSRRB on 29 August 2005. We are still awaiting final approval from HSRRB.

Staff Changes: None.

Blanchfield Army Community Hospital initially received approval from the IRB at Eisenhower Army Medical Center (EAMC) on 22 June 2004. However, CIRO closed the study at Blanchfield during the continuing review held in May 2005 as the assigned Principal Investigator (PI) changed duty stations. A new PI has been appointed and is in the process of meeting the requirements in order to once more submit the protocol for review.

Staff Changes: CPT Robert Moore, MD PCS without notification. CPT Carol Rowe, MD joined the study as the new PI on 25 September 2005.

Naval Hospital Bremerton (NHB) and Naval Hospital Oak Harbor (NHOH) applied for approval through the [IRB at Naval Medical Center San Diego \(NMCSD\)](#) on 14 September 2005. Now that all the IRB recommendations have been met, the protocol will be scheduled for

another IRB review in March 2006. The Memorandum of Understanding between Madigan and the Navy facilities has been completed. The 3-party Cooperative Research Development Agreement (CRDA) between TRUE Research Foundation, Oregon Health & Science University, and NHB/NHOH was signed by all parties and forwarded to MHS in San Diego for approval by 16 September 2005.

Staff Changes:

NHB staff: CDR Karie Anderson, MD (PI) and LCDR Rosemarie Dieffenbach, MD (AI) left the study when they separated from the Navy in September 2005. LCDR Christopher Westbrook, MD and CDR Ronald Dommermuth, MD joined the study in January 2005 as AIs. CDR Charles Blackadar, MD joined the study as medical monitor in January 2005. NHOH staff: LT Amy Shipley, MD left the study when she separated from the Navy in September 2005. In October 2005, CDR Jay Stinson, MD joined the study as medical monitor when LT M. Williams deployed overseas.

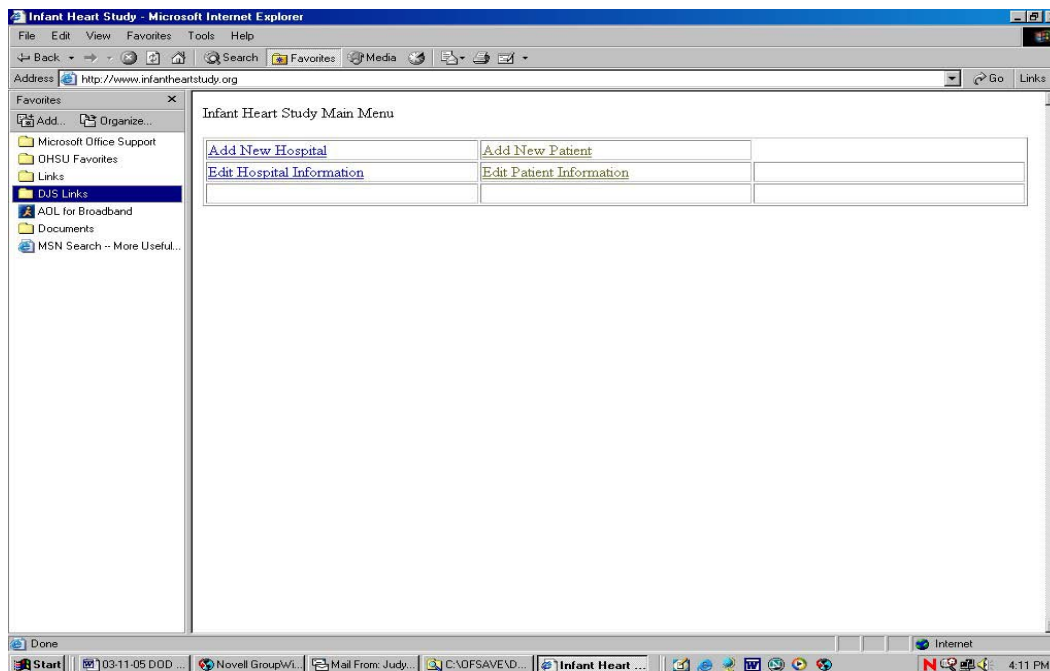
Summary of Human Subject Protocol approval:

All military sites approved except for Naval Hospital Bremerton and Naval Hospital Oak Harbor; pending review of IRB recommendations by USNMC San Diego. Protocol activation at Yukon-Kuskokwim Health Corporation, AK is still on hold at this time.

All locally approved protocols have been submitted to the HSRRB for final review. We are awaiting HSRRB authorization to begin enrolling subjects at the approved sites.

3. Web-based data entry of patients and selection of historical controls
Starting

The secure website for data entry www.infantheartstudy.org, moved to a different network host that meets to exceed all security measures necessary for data collection. The website is now fully operational. Selected individuals who are fully trained and ready to start the study have been assigned a username and password.



Initial Encounter Form

Date of echocardiogram:	<input type="text"/>			
Time to diagnosis:	days <input type="text"/>	hours <input type="text"/>	minutes <input type="text"/>	
Type	Emergent <input type="checkbox"/>	Elective <input type="checkbox"/>		
Time from first phone call to echo interpretation	Days <input type="text"/>	hours <input type="text"/>	minutes <input type="text"/>	
Transmission Time	minutes <input type="text"/>			
Elapsed time if >= 3 hours please explain	<div><div></div></div>			
Referring site:	<input type="text"/>	Referring Physician:	<input type="text"/>	
Tertiary care site:	<input type="text"/>	Distance from referring site (in miles/minutes)	<input type="text"/>	<input type="text"/>
DOB	<input type="text"/>	Time of Birth	<input type="text"/>	
Ht (cm)	<input type="text"/>	Weight (kg)	<input type="text"/>	or Ht(inches) <input type="text"/> Weight (ounces) <input type="text"/>
Gender	M <input type="checkbox"/> F <input type="checkbox"/>		Gestational age (weeks)	<input type="text"/>
Ventilated	<input type="checkbox"/>	Not ventilated	<input type="checkbox"/>	Referred by fetal echocardiogram Yes <input type="checkbox"/> No <input type="checkbox"/>

Referring diagnosis (reason for echo)

Pretransmission Diagnosis

Diagnosis	Significant	Minor	Diagnosis	Significant	Minor
CNS	<input type="checkbox"/>	<input type="checkbox"/>	GI	<input type="checkbox"/>	<input type="checkbox"/>
GU	<input type="checkbox"/>	<input type="checkbox"/>	Multiple congenital anomalies	<input type="checkbox"/>	<input type="checkbox"/>
Musculoskeletal	<input type="checkbox"/>	<input type="checkbox"/>	Respiratory	<input type="checkbox"/>	<input type="checkbox"/>

Syndrome	<input type="checkbox"/>	<input type="checkbox"/>			
Type of traditional care delivered					
No entry					
Diagnosis at outreach site after traditional care delivery - primary					
Anomalous left coronary artery					
Final Diagnosis at referral site after repeat echo or additional testing		Anomalous left coronary artery			
Medical outcomes		Post Transmission Diagnosis			
No entry		Anomalous left coronary artery			
Final Diagnosis - Primary			Recommended follow-up after transmission:		
Anomalous left coronary artery			Anomalous left coronary artery		
Recommended follow-up after transmission			Patient transferred		

Transmission problems - mark all appropriate problems



Audio <input type="checkbox"/>	Telecommunication <input type="checkbox"/>	Video <input type="checkbox"/>
Could not transmit <input type="checkbox"/>	Other <input type="checkbox"/>	

Please take a moment to review your input before submitting. Thank you. At this point you may want to print this page for your files.

Follow-up Encounter Form

Follow-Up Type	No entry	Tertiary Hospital:	3rd Medical Group (3MDG)
Tertiary Hospital ICU Days		Tertiary Hospital Ward Days	
Tertiary		Outreach	

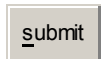
Hospital Nursery Days	<input type="text"/>	Hospital	<input type="text"/>
Outreach Hospital ICU Days	<input type="text"/>	Outreach Hospital Days	<input type="text"/>
Outreach Hospital Ward Days	<input type="text"/>	Outreach Hospital Nursery Days	<input type="text"/>
Transport to tertiary	<input type="text"/>	Tertiary Transport Date	<input type="text"/>

Cath Date	<input type="text"/>	Cath Primary Diagnosis	A <input type="text" value="Coronary artery"/> 
Subsequent Cath Date	<input type="text"/>	Surgical Date	<input type="text"/>
Discharge Date	<input type="text"/>	Surgical Primary Diagnosis	N <input type="text" value=""/> 
Cardiology/CV surgery visits scheduled	<input type="text"/>	Physical Therapy Visits	<input type="text"/>
Nutrition Visits	<input type="text"/>	Speech Visits	<input type="text"/>
Occupational Therapy Visits	<input type="text"/>	Neurology Visits	<input type="text"/>
Other Visits	<input type="text"/>	Genetics Visits	<input type="text"/>
ENT Visits	<input type="text"/>	Audiology Visits	<input type="text"/>
Renal Visits	<input type="text"/>	No Transport ICU Days	<input type="text"/>
Outreach Ward Days	<input type="text"/>	No Transport Nursery Bed Days	<input type="text"/>
Outreach ICU Days	<input type="text"/>	Outreach Ward Days	<input type="text"/>
Outreach Nursery Bed Days	<input type="text"/>	Cardiology/CV surgery visits scheduled	<input type="text"/>

Other Outreach Clinic Visits

Cardiology Visits	<input type="text"/>	Physical Therapy visits	<input type="text"/>
Nutrition Visits	<input type="text"/>	Speech Therapy Visits	<input type="text"/>
Occupational Therapy Visits	<input type="text"/>	Neurology Visits	<input type="text"/>
Other Clinic Visits	<input type="text"/>	Genetics Visits	<input type="text"/>
ENT Visits	<input type="text"/>	Audiology Visits	<input type="text"/>
Renal Visits	<input type="text"/>		

Please take a moment to review your input before submitting. Thank you. At this point you may want to print this page for your files.



4. Data review - Not yet started

5. Data analysis - Not yet started

Periodic core group meetings would be implemented for data analysis. Periodic meetings of the entire Network

6. Program evaluation

At the end of the study, equipment would remain in the outreach center and they would be free to use it as their medical staffs determined. They would also be free to seek their own telemedicine contacts for continued endeavors

We hope to use carryover of unspent awarded funds to extend activity beyond the original ending date of March 2007 – expecting at least 18 months of continuation of the study



Key Research Accomplishments

CPT Ronald Wells at Bassett Army Community Hospital performed, late last winter, an unofficial exam. (BACH) in Anchorage. Dr. Wells had done his residency at MAMC and worked with Drs. Kinney and Puntel. He was planning on training in Pediatric Cardiology on a Military sponsored fellowship at OHSU and had been accepted to the fellowship for summer 2005. He needed to complete 2 years of active duty and was, therefore, stationed at BACH. In late February 2005, after he had been trained on his SonoHeart®, and before his Telemedicine NIPRNET connection was activated, he performed an echo on a cyanotic newborn infant and in discussing the echo with COL Kinney, it was confirmed that he had correctly diagnosed the baby with Hemi-Truncus, a complex cyanotic heart condition. The baby was promptly transferred to Anchorage for stabilization and cardiac treatment and eventually underwent corrective surgery at Emmanuel Hospital in Portland.

The first Remote Supervision subject was enrolled in the study at Bassett Army Community Hospital on 20 January 2006. Justifying the need for remote site echocardiography, Bassett called Madigan just .50 an hour after evaluation and receiving clearance to begin subject enrollment! Dr Kinney was visiting Bassett for the quarterly pediatric cardiac clinic and oversaw the finalization of Bassett's TeleEcho System. Since many patients cancelled appointments due to severe weather in Fairbanks, AK (temperature was -35° Fahrenheit) Dr Kinney and Dr Garfinkle performed an echocardiogram on an active duty soldier who volunteered. The call was placed at 768kbps at 1300 from BACH to MAMC. Audio and color transmitted well, though we experienced some lost video packets and tiling. Despite the image quality, Dr Puntel, at MAMC was still able to see the echocardiogram in sufficient detail.

At 1430, Dr Garfinkle at BACH called because a 2 week male came into the clinic with a loud murmur, suspected to be pulmonic stenosis. This was only half an hour after Dr Kinney left for the airport! The infant had been sent up for an EKG, so she would call later to perform the supervised echocardiogram. Dr Garfinkle called again at 1700; BACH and MAMC were ready to go! Dr Garfinkle did a wonderful job performing the echocardiogram. With Dr Puntel's expert direction and supervision, she successfully hit all 4 views. Dr Puntel diagnosed the infant with a healthy heart, physiologic peripheral pulmonary artery stenosis and a patent foramen ovale, physiological for a newborn infant. The entire call took about 25 minutes.

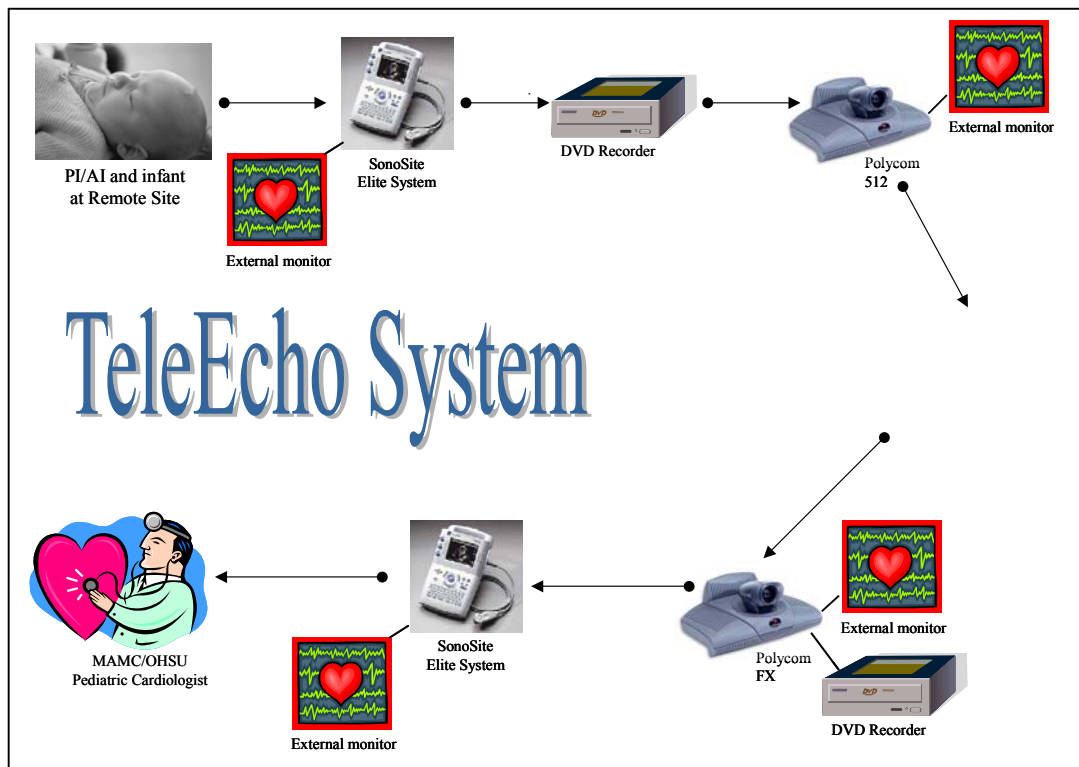
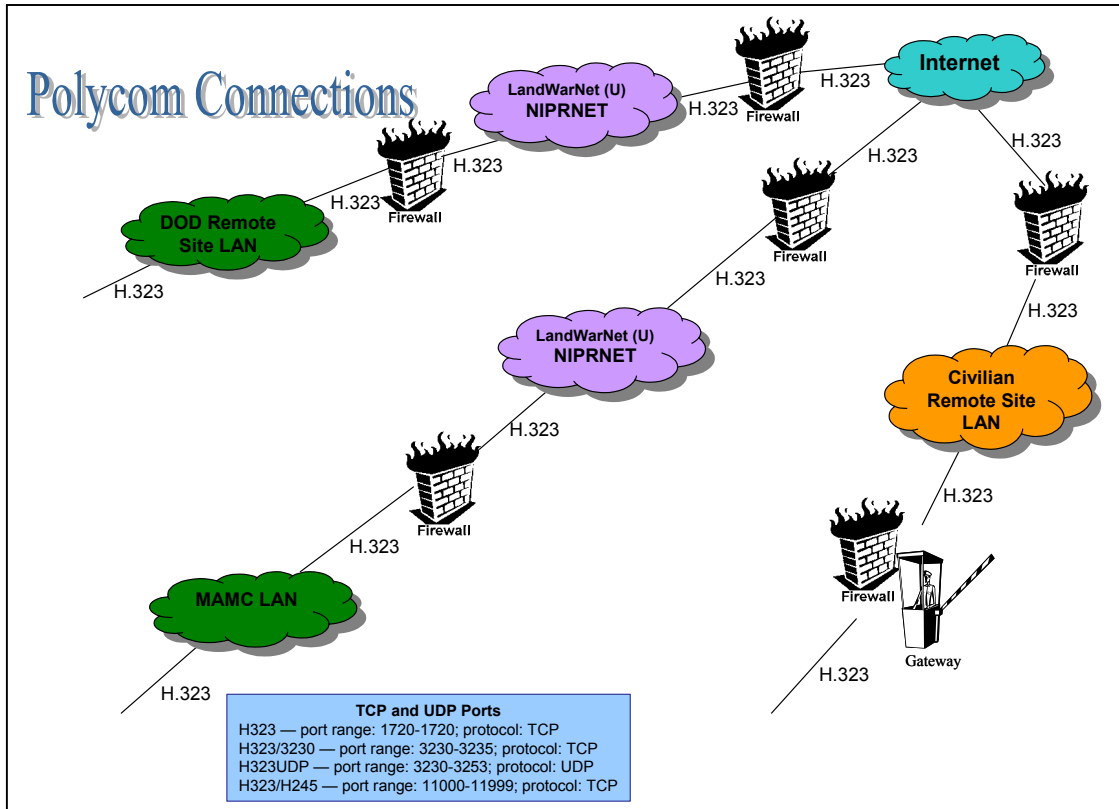
Reportable Outcomes

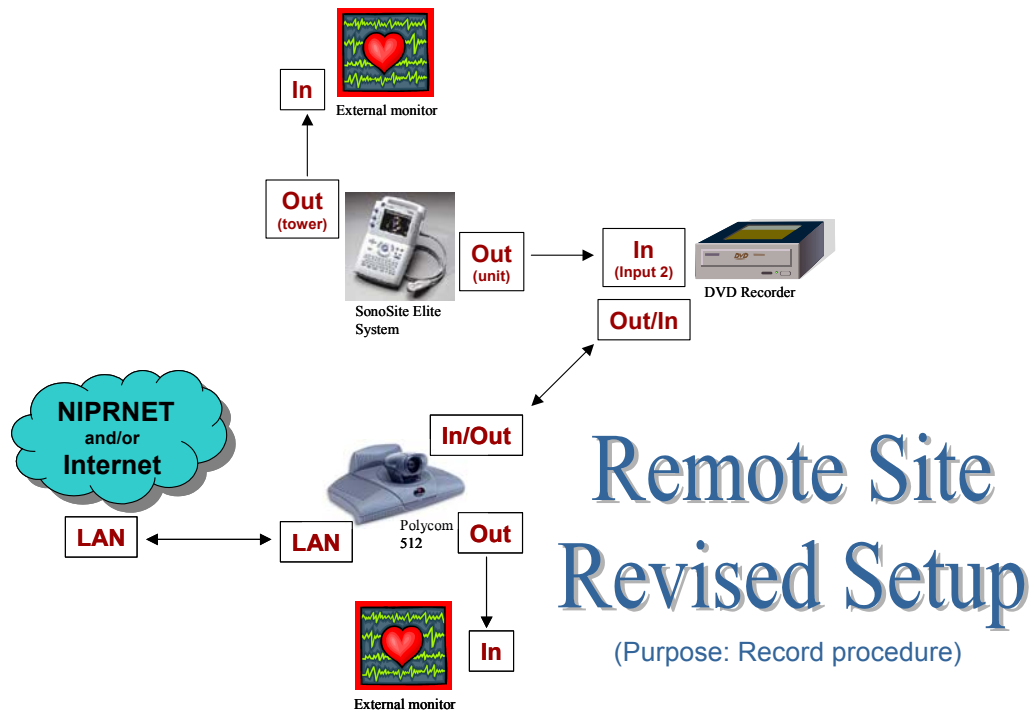
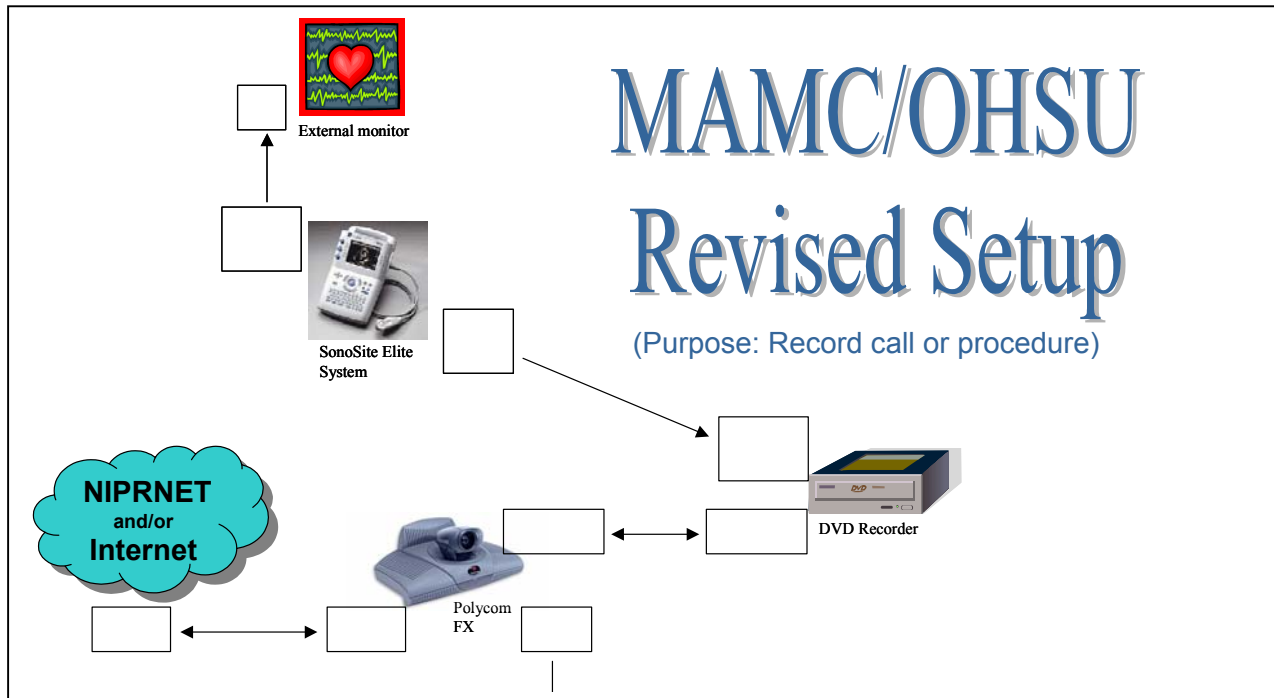
A software program has been developed which operates through the NIPRNET and the Polycom® units- will allow the remote supervisor to operate a number of track ball accessible adjustments on the Titan® ultrasound scanner being used to study patients at the distant site. Since this is a fully digital system- the remote control allows optimization of more controls of Doppler parameter control, Color Doppler Quality, and directed sampling for M mode and spectral Doppler recordings.

New Scanners to be installed

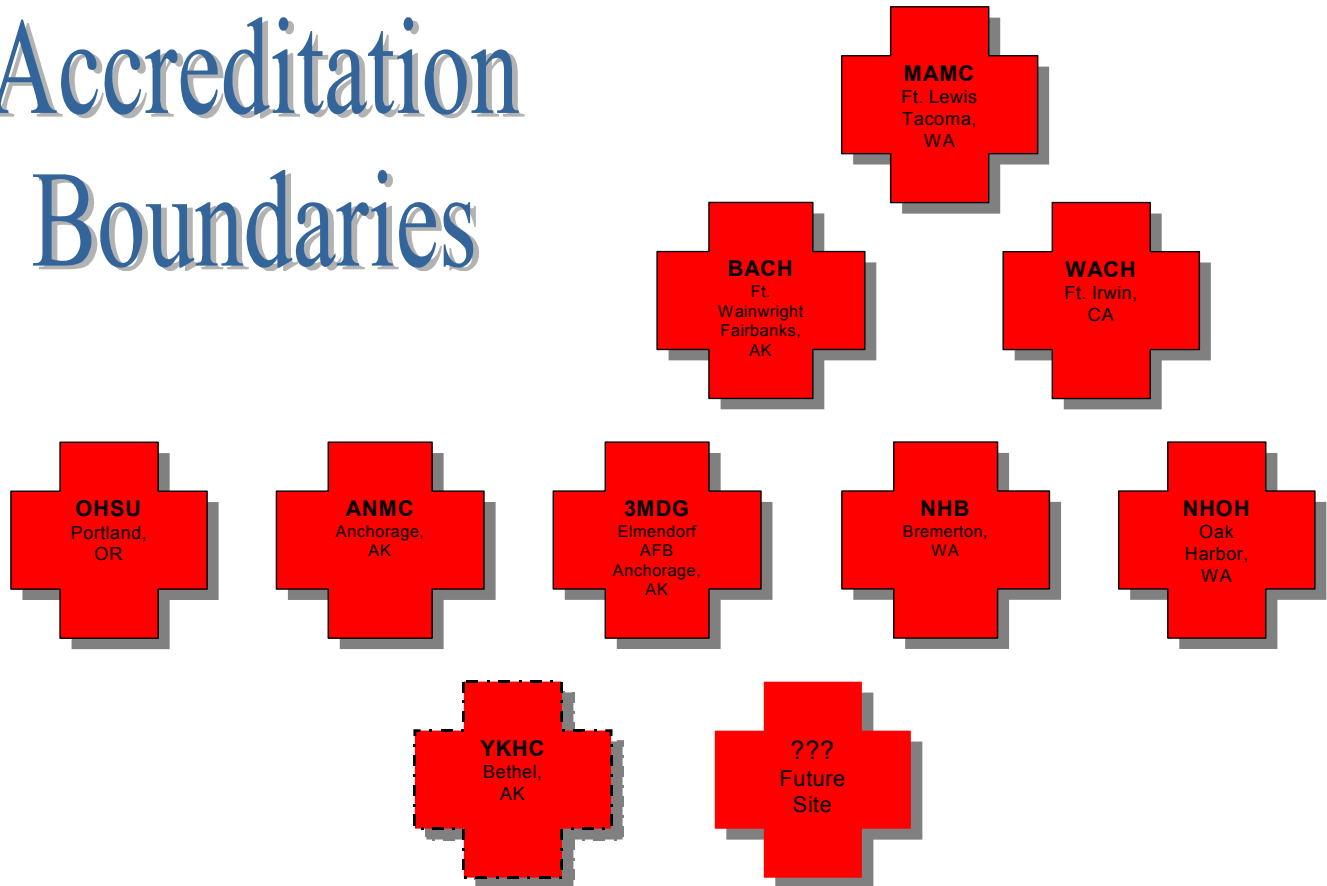
We have completed negotiations with SonoSite® who will fulfill their obligation to replace the SonoHeart Elite® systems with their new Digital system the Titan®- and adapt the remote control program written for this project to run on the new system. The Titan has better color Doppler quality and the curved array transducer runs at between 8.5 and 11MHZ. Minimal instruction will be required for our remote sites to learn how to use the system. The control philosophy is very similar but the control interface is larger and easier to use.







Accreditation Boundaries



Conclusions

While our program had been slowed down by the multiple HS approvals required, and the complex arrangements we undertook to avoid prohibitive costs for ISDN lines- and attempt to place our Telecommunications system on NIPRNET. Both of the above actions although very time consuming have been successfully completed. Only YHC- in Bothell, Alaska- remains waiting to enter the study- once new staff arrives this spring and can be trained.

The year Dr. Puntel spent stationed in Iraq slowed us down as well but we're all thrilled to have him back and he's really committed to getting study recruitment started. The remaining activity this winter will be to swap out the SonoHeart Elite© systems for the new Titan© scanners and brush up trained individuals on the new control philosophy.